

We Claim:

1. A fan housing for a fan rotatable about an axis, the fan housing comprising:

a first housing component at least partially defining

an internal chamber adapted to receive the fan; and

an inlet wall having an inlet aperture through which fluid enters the fan housing;

the first housing component comprising

a transition section extending away from the inlet aperture toward an

exhaust outlet and through which fluid passes from the internal

chamber to the exhaust outlet;

an axially-extending side wall located adjacent the exhaust outlet; and

a wall integrally formed with the inlet wall, running around the inlet

aperture, and extending generally axially into the internal chamber;

a second housing component complementary to the first housing component and at least

partially defining the internal chamber, the second housing component comprising

a transition section extending toward the exhaust outlet and through which

fluid passes from the internal chamber to the exhaust outlet; and

a side wall extending axially toward the first housing component and

shaped complementary to the axially-extending side wall of the

first housing component; and

a housing seam defined between the side wall of the first housing component and the side

wall of the second housing component, the seam having a length extending at

least partially about the axis while extending axially.

2. The fan housing as claimed in claim 1, wherein the wall integrally formed with the inlet wall has a portion extending radially inwardly to at least partially define an inlet restriction of the fan housing.

3. The fan housing as claimed in claim 2, wherein the wall integrally formed with the inlet wall extends axially into the fan.

4. The fan housing as claimed in claim 1, further comprising:  
a cutoff located adjacent the exhaust outlet and defining high and low pressure areas at  
different circumferential positions about the axis; wherein  
5 the seam runs about the axis from one side of the exhaust outlet to another side of the  
exhaust outlet; and  
the cutoff is located between the exhaust outlet and the length of the seam extending at  
least partially about the axis while extending axially.

10 5. The fan housing as claimed in claim 1, wherein the seam extends from an axial location  
substantially co-planar with the inlet wall to an axial location disposed from the inlet wall.

6. The fan housing as claimed in claim 1, wherein:  
the second housing component further comprises a wall spaced a distance from the inlet  
15 wall to at least partially define the internal chamber; and  
the seam extends from an axial location substantially co-planar with the wall of the  
second housing component to an axial location disposed from the wall of the  
second housing component.

20 7. The fan housing as claimed in claim 1, wherein:  
the side wall is substantially volute, and extends between a location adjacent one side of  
the exhaust outlet to a location adjacent another side of the outlet; and  
the length of the seam extending at least partially about the axis while extending axially  
is located adjacent the exhaust outlet.

25 8. The fan housing as claimed in claim 7, wherein:  
the length of the seam extends about less than a majority of the circumference of the side  
walls; and  
another length of the seam extends about another portion of the circumference of the side  
30 walls.

9. The fan housing as claimed in claim 1, wherein the length of the seam extending at least partially about the axis while extending axially runs in a direction away from the inlet wall with increasing proximity to the exhaust outlet.

5 10. The fan housing as claimed in claim 1, wherein each of the first and second housing components has a flange, the flanges of the first and second housing components defining the housing seam therebetween.

11. The fan housing as claimed in claim 4, wherein the side wall of the second housing  
10 component extends about the axis and ends a distance short of the cutoff.

12. The fan housing as claimed in claim 1, wherein:

fluid flow through the fan housing includes a flow path extending from a location upstream of the transition sections to the exhaust outlet;

15 a first plane in which the axis lies extends through portions of the first and second housing components at a location upstream of the first and second transition sections to define a substantially rectangular cross-sectional shape; and

a second plane substantially perpendicular to flow toward the exhaust outlet extends through the first and second transition sections to define a substantially round cross-sectional shape.

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13. The fan housing as claimed in claim 1, wherein the exhaust outlet at least a part of the first and second transition sections are axially displaced with respect to the rest of the fan housing.

14. The fan housing as claimed in claim 1, wherein the first housing component includes a  
25 axially-extending wall adjacent the inlet aperture.

15. The fan housing as claimed in claim 13 wherein the axially-extending wall is an annular wall extending axially into the internal chamber.

16. A two-piece fan housing for receiving a fan rotatable about an axis, the two-piece fan housing comprising:

a first housing piece comprising:

a first wall;

an inlet aperture defined in the first wall through which fluid enters the fan housing; and

a transition section extending to and partially defining an exhaust outlet of the fan housing through which fluid exits the fan housing;

a second housing piece shaped complementary to the first housing piece and comprising:

a second wall spaced from the first wall; and

a transition section extending to and partially defining the exhaust outlet;

a side wall extending about the axis between the first and second walls of the first and second housing pieces, the side wall comprising an axial length between the first and second walls, at least a majority of the axial length of the side wall adjacent to the exhaust outlet defined by the first housing piece, and at least a majority of the axial length of the side wall in other locations around the axis defined by the second housing piece; and

a seam defined between adjacent portions of the first and second housing pieces, the seam running about the axis, comprising a first portion running partially about the axis while also running in an axial direction, and further comprising a second portion lying within a plane substantially perpendicular to the axis, wherein the first and second portions of the seam are joined by an axially-curved third portion of the seam integral with the first and second portions.

17. The two-piece fan housing as claimed in claim 16, wherein the axial length of the side wall is substantially constant in a majority of locations about the axis.

18. The two-piece fan housing as claimed in claim 16, wherein the plane is a first plane, and wherein the seam further comprises a fourth portion lying within a plane substantially perpendicular to the axis and spaced an axial distance from the first plane.

19. The two-piece fan housing as claimed in claim 18, wherein the first and fourth portions of the seam are joined by an axially-curved fifth portion of the seam integral with the first and fourth portions.

5 20. The two-piece fan housing as claimed in claim 16, wherein the first portion of the seam extends at least 1/8 way around the fan housing.

21. The two-piece fan housing as claimed in claim 16, wherein the first portion of the seam extends at least 1/3 way around the fan housing.

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22. The two-piece fan housing as claimed in claim 16, further comprising flanges extending radially away from the seam at the first, second, and third portions of the seam, wherein the flanges at the second and third portions of the seam are curved.

15 23. The two-piece fan housing as claimed in claim 16, further comprising a wall integrally formed with the first wall, running around the inlet aperture, and extending in a generally axial direction.

20 24. The two-piece fan housing as claimed in claim 23, wherein the wall integrally formed with the first wall has a portion extending radially inwardly to at least partially define an inlet restriction of the fan housing.

25 25. The two-piece fan housing as claimed in claim 24, wherein the wall integrally formed with the first wall extends axially into the fan.

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26. The two-piece fan housing as claimed in claim 16, further comprising:  
a cutoff located adjacent the exhaust outlet and defining high and low pressure areas at  
different circumferential positions about the axis; wherein  
the seam runs about the axis from one side of the exhaust outlet to another side of the  
30 exhaust outlet; and  
the cutoff is located between the exhaust outlet and the first portion of the seam.

27. The fan housing as claimed in claim 16, wherein:

the side wall is substantially volute, and extends between a location adjacent one side of  
the exhaust outlet to a location adjacent another side of the outlet; and

the length of the first portion of the seam is located adjacent the exhaust outlet.

28. A method of manufacturing a two-piece fan housing for receiving a fan rotatable about an axis, the method comprising:

forming a first wall from a first substantially flat sheet of material;

forming an inlet aperture in the first wall;

forming an axially-extending inlet wall from the first substantially flat sheet of material,  
the axially-extending inlet wall running about the inlet aperture;

forming a first transition section from the first substantially flat sheet of material, the  
first transition section extending to and partially defining an exhaust outlet of the  
fan housing;

forming a first portion of a volute housing side wall from the first substantially flat sheet  
of material;

forming a second wall from a second substantially flat sheet of material;

forming a second transition section from the second substantially flat sheet of material,  
the second transition section extending to and partially defining the exhaust  
outlet;

forming a second portion of a volute housing side wall from the second substantially flat  
sheet of material, the second portion of the volute side wall having a shape  
complementary to the first portion of the volute housing side wall; and

coupling the first and second portions of the volute housing side wall together along a  
seam that extends axially while also extending circumferentially.

29. The method as claimed in claim 28, wherein the first and second flat sheets of material are  
sheet metal.

30. The method as claimed in claim 28, wherein:

the side wall has an axial length;

at least a majority of the axial length of the side wall adjacent the exhaust outlet is

defined by the first portion of the volute side wall; and

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at least a majority of the axial length of the side wall in other locations around the axis

defined by the second portion of the volute side wall.